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BOOK-REVIEWS.

The American Journal of Psychology. Ed. by G. STANLEY HALL. Baltimore.

THE announcement made some months ago, that a journal devoted to the scientific aspects of psychology was to be published under the auspices of the Johns Hopkins University, excited considerable comment. Some seemed to think that we had philosophical journals in abundance, and whatever surplus energy America had in reserve in this direction might well be utilized in strengthening the journals of England and the continent; others doubted whether so small a department could really supply material enough to sustain even a quarterly periodical; while those who have not yet become acclimatized to the new atmosphere that is slowly but surely displacing the old, dogmatic, non-progressive, and lifeless treatment of psychological topics, intimated that they saw in the new-comer a further belittling of a noble study, and the harbinger of a much hated 'materialism.' The first number of the journal proves beyond a doubt, that, for a time at least, the material will not be wanting, and quite as certainly shows that the movement in favor of an experimental psychology is strong and important enough to merit a separate organ of publication. If we add to this the guaranty of sound scholarship and all-sided appreciativeness that the name of the editor (as also of the university from which it comes) affords, we seem justified in welcoming the journal as an ornament to American science, and as promising to mark an era in the development of one of the most significant movements of our age.

The two main purposes of the journal are to publish original studies, and to review the psychological literature. The first is represented by four articles, all worked out upon an experimental basis; while the critiques and notices fill no less than seventy-eight finely (perhaps too finely) printed pages. The leading article is contributed by Dr. Warren P. Lombard, and describes a very remarkable series of experiments upon the variations in the extent of the 'knee-jerk' under various conditions of the nervous system. It is well known that if one leg is supported, and the knee partly flexed (most conveniently by crossing one leg over the other), a sudden blow upon the ligament just below the knee-pan will cause an involuntary and jerky movement of the foot. This apparently insignificant phenomenon became of special importance when it was observed that it was generally absent in a common form of spinal-cord affection known as *Tabes dorsalis*. The nature of the process is discussed in quite an extensive literature, and the two main opinions regard it as (1) a simple reflex act, with a direct course from the tendon to the lumbar cord and back to the muscle, and (2) as an act not reflex (because the time it takes is much too short), but rather as a mechanical effect under the influence of a reflex centre, — a 'tone' rendering the muscle more or less susceptible to such stimuli. In either case the variations in the extent of the movement are co-ordinated with the condition of the nervous centres, and thus become an index — and, as Dr. Lombard shows, an incredibly delicate index — of a very mysterious central process. Previous observers had shown that a violent contraction, such as clinching the hands, or even slighter movements, as well as strong sensory stimuli, just before the striking of the ligament, greatly increased the extent of the resulting movement. This was explained by supposing that the effect of the movement was to increase the irritability of the cord-centres (perhaps by removal of inhibitory influence from the brain), on whose integrity the knee-jerk depends. Dr. Lombard was able to secure more delicate results by substituting a blow from a hammer swinging through a definite arc, and striking with a constant force for the unequal movement of the hand, and the writing of the resulting movement of the foot on smoked paper instead of its rough estimation by the eye. The first result of this method was to show that the extent of successive knee-jerks produced by equal blows of the hammer was very different; and this, too, when the subject was lying perfectly at ease, and so avoided all re-enforcements by voluntary motion. On comparing these variations with those resulting from true re-enforcements, it was clear that they might be due to very slight changes in the individual; and, by taking the average of a score of movements, it was found that their extent varied quite constantly with the force of the blow.

Dr. Lombard then subjected himself for two weeks to a tedious routine of work, recording his knee-jerk under precise conditions at eight definite times of the day, and keeping a diary of his general condition, as well as recording the condition of the temperature, barometer, etc. In this way he accumulated the records of over six thousand observations, suggesting several interesting results. In brief, he shows that this index of the condition of the nervous system is sufficiently delicate to be regularly influenced by the time of day (it begins low, rises very much after breakfast, and then gradually sinks with several ups and downs); by the taking of a meal (notably rising after breakfast); by fatigue, either physical or mental (in both cases showing marked decrease); by the slightest movement (i.e., the re-enforcements by talking, swallowing, etc.) or attractive sensations of sound, light, etc.; by all kinds of mental excitement; by holding the breath (a very marked increase when held for a minute or so); by the state of the thermometer (in general diminishing as the temperature increases), as of the barometer (quite closely rising and falling with a rise and fall in the barometric column).

An adequate idea of the delicacy of these variations with different mental conditions can only be gained by a citation. "One day during the experiments a procession passed the end of the street, a short distance away, and the effect of the music was very evident. The twenty-five experiments of the examination which had just been made had shown the average knee-jerk to be 32 millimetres. At the approach of the procession, the subject resumed his place on the apparatus, but the first blow was not struck until the first band was passing the end of the street, — 60,¹ 71, 74, 70, 60, 55; another band immediately followed, and it began to play 'My Maryland' just before it reached the street, — 62, 76, 76, 74, 71, 66, 59, 64, 59; this was followed by a drum corps, — 48, 55, 51, 55, 53, 49, 52; and then the music died away in the distance, and only the ordinary street-sounds remained, — 40, 45, 37, 30, 39, 53, 37, 29." In short, not only does music re-enforce the knee-jerk, but the character of the music, especially its emotional power, determines the amount of such influence. That these results are not the result of an anticipation by a theory is shown very conclusively by the fact that on several occasions Dr. Lombard fell into a more or less deep sleep during the experiments, and, if the blow happened to come just after dreaming of an exciting event, the knee-jerk (very low by the inactive condition of the subject) showed a sudden rise. The phenomena are thus taken outside the conscious realm. It seems no illegitimate use of the imagination to picture the time when the inquiry after one's health will take the form of, "How is your knee-jerk?" or the poet describing the effect of anger will exclaim, "Truly, my knee-jerk arose."

The remaining articles — on dermal sensitiveness to gradual pressure-changes, by Prof. G. Stanley Hall and Yuzero Motora; on a method for the experimental determination of the horopter, by Christine Ladd-Franklin; and on the psychophysics law and star-magnitudes, by Dr. Joseph Jastrow — are of a more technical character; and this is a very laudable feature, for it serves not only to frighten off the many dilettanti of psychic research, but to justify the strictly scientific methods of psychology. Professor Hall and Mr. Motora describe a new method of experimentation, by which a weight pressing upon the finger is either gradually increased or gradually diminished, and the sensibility is measured by the time necessary for the subject to decide in which direction the change has been made. The problem is a very complex one, involving not only the amount of change, the rapidity of change, and the initial pressure, but also the 'confidence' of the subject. The interesting results reached are only preliminary, but foretell a hopeful future for this valuable new method. Mrs. Franklin describes a very striking illusion, consisting of the appearance of a third line at right angles to the plane of the paper, on which a pair of crossed lines, with their acute angle towards the observer, are viewed in a certain position relative to the eyes. These small upright phantom-lines are so distinct that they furnish a means of determining the shape of the horopter (i.e., the sum of the points which in a given position of the eyes will seem single), at least in its simpler forms. Dr. Jastrow utilizes the comparison of the photometrically measured illuminating powers of the stars (made by the Harvard Observatory)

¹ The numbers refer to the extent of the knee-jerk in millimetres

with the naked-eye estimation of their serial magnitudes, to find what is the relation between the two series; i.e., as the magnitudes increase by apparently equal intervals of brightness, how do the measured illuminating-powers increase? He finds, that, as the psychophysical law requires, the latter increase by a constant *ratio*, but that this ratio is not exactly constant, but decreases slightly (according to a formula given in the paper) with the brightness of the stars.

The critical portion of the journal will perhaps arouse more comment than the original part, because it comes more in conflict with current views on psychological topics. While not taking an aggressive tone, the policy of the journal is evidently to plainly and forcibly state the broader inferences upheld by a technical study of mental facts, and, if necessary, to fearlessly combat views opposed to or neglecting such considerations. The able detailed review of the work of the English Society for Psychic Research is sure to attract attention. The point of view is decidedly negative. The evidence in favor of 'telepathy' is regarded as entirely inconclusive by lack of a host of necessary precautions, as well as a consideration of other modes of explanation. It is an aspect of the question the importance of which will be more and more generally recognized as the first gust of enthusiasm excited by apparently wonderful results subsides. A review of the psychological text-books of Professors McCosh, Bowne, and Dewey is a destructive criticism of the standpoints from which these writers set out, while Professor Ladd's 'Physiological Psychology' receives very just proportions of praise and blame.

In addition to this, there is a review of the 'brain-localization' question by Dr. Starr, of Mr. Galton's views on the persistency of type by Professor Brooks, of Delage's researches on the functions of the semicircular canals by Professor Sewell, and a note on logical machines by Mr. C. S. Peirce, together with a large number of useful minor reviews and notes. An undue number of misprints disfigure some of the pages.

Greeko-Slavonic Literature. By M. GASTER. London, Trübner. 8°.

THE importance of researches on the growth of folk-lore is more and more recognized. While in the early times of this study the lore of each nation was considered as an outcome of its ancient mythology, later on the interdependence of the traditions of nations widely separated in space and time was more clearly understood, and researches on the origin and migration of legends became of greater importance. While this historical point of view is the leading one in the inquiries of most students, the psychological character of each nation as influencing its folk-lore must not be disregarded. The present volume treats of the connection between European folk-lore and the early literature of Slavonic nations. The author treats first of the influence of Bogomilism upon the religious literature which later on became folk-literature of the European nations. He traces the latter back to Greek texts which came to Constantinople from the east, and passed thence to the Bogomils. A second source, equally Oriental in its origin, was supplied by Jewish legends. He discusses the Apocrypha of the Old and New Testaments in its influence upon European literature, and shows in a few instances the interesting phenomena of their transition from tales into ballads, and from ballads into lyrics, in which the name of the hero disappears gradually, and a personal song is changed into a general impersonal one. The author finds in the belief of witchcraft in the Graal legend and other traditions, not those relics of hoary antiquity which they are generally considered, and as which they have become the object of a reconstructive mythology, but a result of the Christian legends and myths, which became the property of the people at a comparatively recent date. In discussing the origin of the romantic literature, Gaster favors the opinion that it was also introduced into Europe by the Slavonic nations, and rejects Benfey's theory that it was communicated to the western people by the Mongolians. In an appendix Gaster tries to solve the problem of the origin of the Glagolitic alphabet, and shows that a connection with the Armenian alphabet is at least probable. The whole volume is an extremely interesting study of the growth of folk-literature, and shows how intricate the channels are from which its sources flow. Great care must be taken in treat-

ing questions of this kind, particularly among nations which have no literature, where historical facts, upon which the study must be founded, are entirely wanting. Particularly in this case rash conclusions must not be made until we are better acquainted with the psychological laws of the growth of folk-lore. The historical method as applied by Gaster is the only one that can lead to satisfactory results, but it must be supplemented by an inquiry into the assimilation of legends by different nations and their blending with the more ancient stock of folk-lore. The latter point has been disregarded by the author, and therefore some of his conclusions on the Oriental origin of certain legends cannot be accepted until fuller proof is given.

An Elementary Treatise on Analytical Mechanics. By WILLIAM G. PECK. New York, Barnes. 12°.

THIS is, as its title implies, an elementary treatise on the subject named, and is of substantially the same character as the majority of works of similar purpose, intended for the introduction of the student into the study of analytical mechanics. Dr. Peck, however, has the advantage, as an author, of having had an unusually extended and very fortunate experience in teaching, and his book may be taken as the embodiment of so much of the subject as he has found the average college-man capable of taking up during the average college course of advanced mathematics. It is intended, as stated in the preface, to include all the principles needed by students in technical courses of study, and the calculus is used to a moderate extent in their development.

This work is by no means such a treatise as that of Bartlett, and is necessarily given a much more condensed and less logical form. It covers, however, the full range of work which the student can be ordinarily expected to take, and it may be made to pave the way most satisfactorily to the use of advanced treatises and the works on applied mechanics which are now studied in the best technical schools and schools of engineering. Its accuracy is vouched for by the reputation and experience of its author, and its plan may be seen by inspection to be good and satisfactorily complete. Kinetics and the doctrine of energy are given the place to which they are entitled, — a place denied them in books following the older writers on this subject. We should suggest that the discussion of the mechanics of gases and vapors might be enlarged profitably by the introduction of the pure thermodynamics of the subject, and that the last chapter, that on machines, might be improved by the revision of the descriptive matter, and by a study of modern examples of such apparatus. No criticism lies against this work especially; but it is time that all these elementary treatises on this subject were pruned of their antique illustrations, — the compound balance, for example, — and modern sketches substituted, such, for example, as Dr. Peck gives us in his article on the rotary-pump. On the whole, this book is one of the very best of its class; and the writer has found, by experience in its use, that it is a most excellent text-book.

NOTES AND NEWS.

THE account of the recent trial in England of the Spanish cruiser 'Reina Regente,' resulting in the development of a speed of 20.6 knots over a measured mile, has been received with keen interest at the Navy Department, where every effort has been made to design vessels of like high speed to meet the demands of Congress. The number of war-ships able to make above 19 knots is much smaller than is commonly supposed, and, in fact, the records of the department show that but two other vessels have been able to attain that speed. These are the 'Dogall,' built in England for the Italian Government, which made one run over a measured mile at the rate of 19.66 knots per hour; and the 'Orlando,' built by private contractors for the English Government, which made one run at the rate of 19.25 knots per hour. It is said at the department that these two vessels, together with the 'Reina Regente,' are the outcome of efforts to reach 19 knots, running through many years; and the small measure of success attained renders it unsafe to guarantee so high a speed for the cruisers now building, and known as the 19-knot cruisers.

— A complete list of the papers presented at the meeting of the National Academy of Sciences, held at Columbia College, New